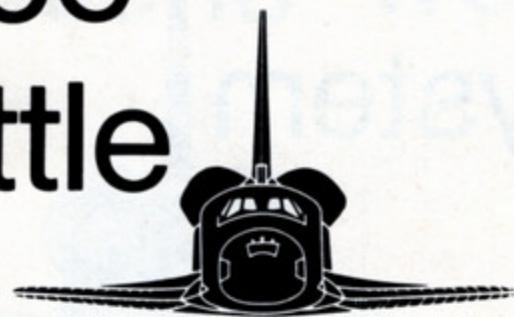


# Space Shuttle

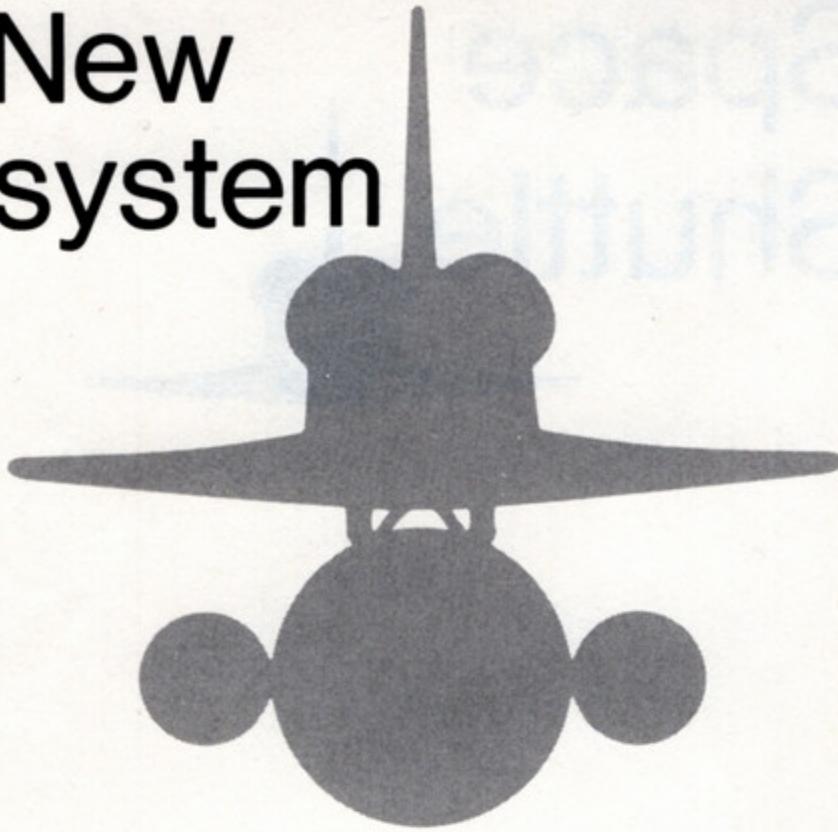


**NASA**

National Aeronautics and  
Space Administration

**John F. Kennedy Space Center**

# New system



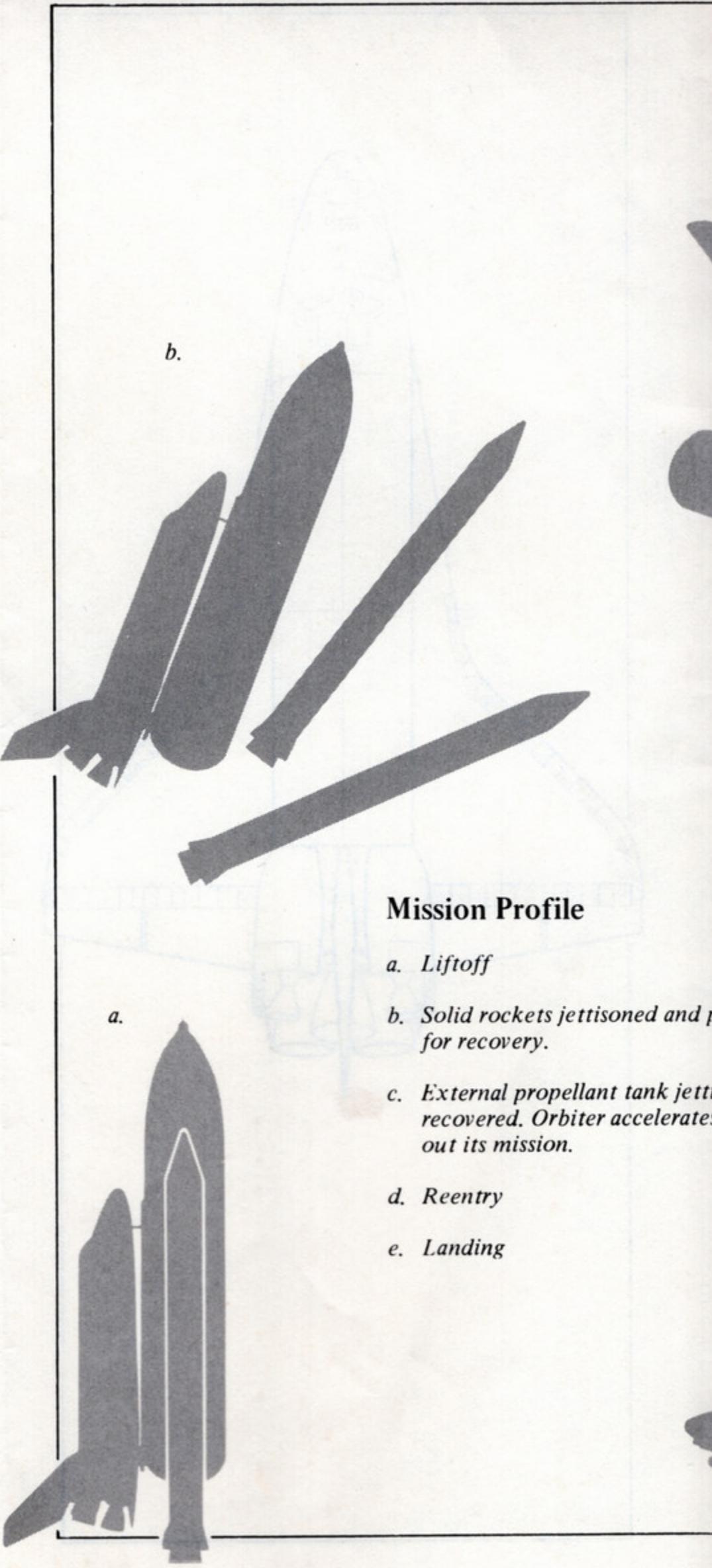
An economical space transportation system is being developed by NASA to carry useful cargo to and from Earth orbit before the end of this decade.

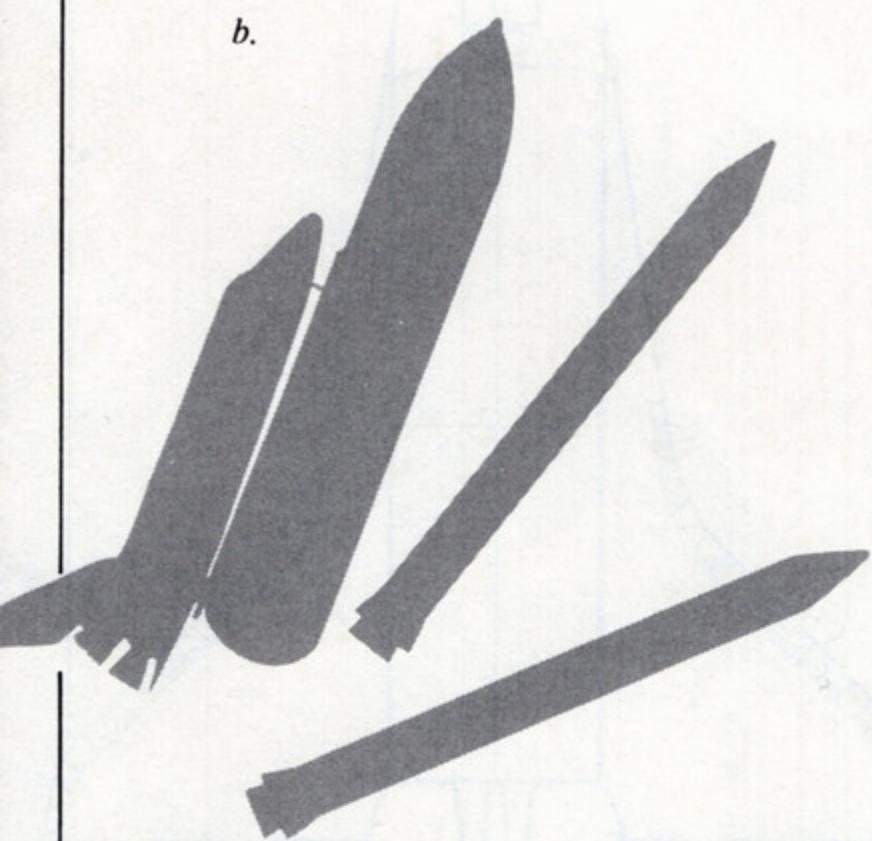
The Space Shuttle, a manned vehicle combining aeronautics and astronautics, will transport people, equipment, laboratories, satellites and propulsion stages.

The Shuttle will consist of two stages during the launch phase of a mission. The vehicle will lift off vertically, using two solid-propellant booster rockets firing in parallel with three liquid-propelled rocket engines of the orbiter, the airplane-like reusable stage.

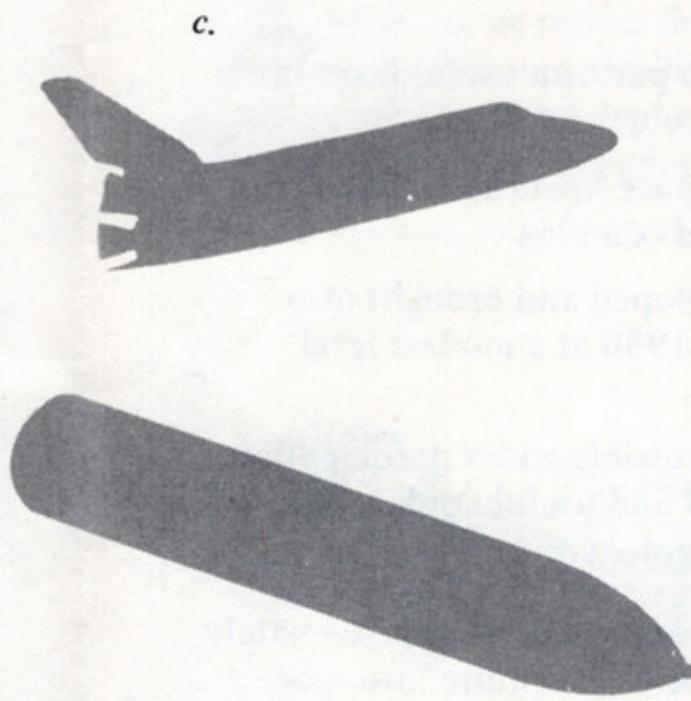
After burnout, the solid rockets will be jettisoned, parachuted to the ocean and recovered for reuse. A large external propellant tank will also be jettisoned, but it will not be recovered. The orbiter will accelerate into orbit, carry out its mission, then reenter the atmosphere and land like an airplane. It can be readied for another flight in 14 days.

The Kennedy Space Center will be the primary launch and recovery base for the Shuttle. Saturn-class assembly, checkout and launch facilities are being modified to handle the new vehicle. Construction of a 4572-meter (15,000-foot) runway adjacent to Launch Complex 39 has already been completed.

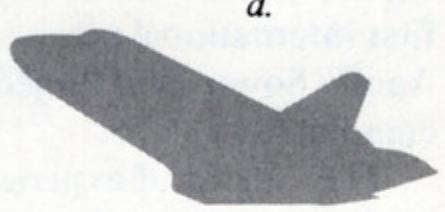




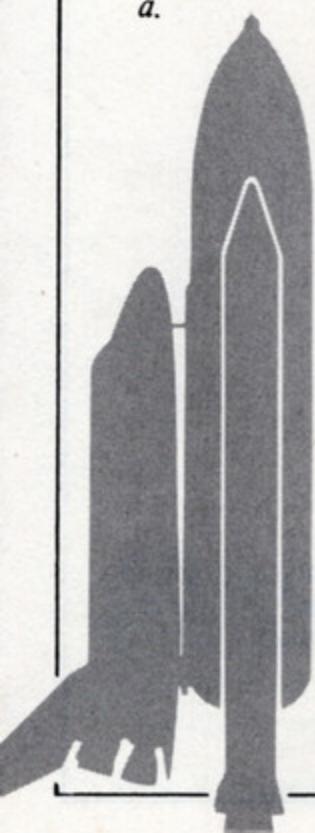
*b.*



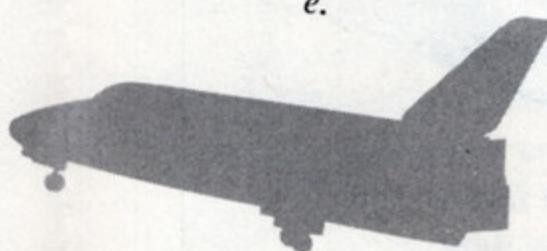
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*d.*



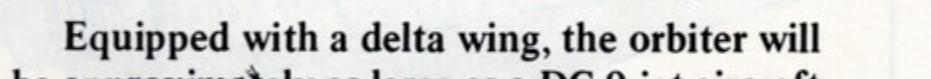
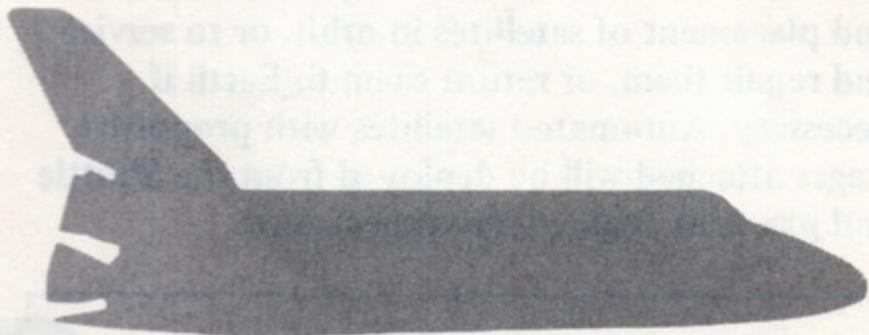
*e.*



## Mission Profile

- a. Liftoff*
- b. Solid rockets jettisoned and parachuted to the ocean for recovery.*
- c. External propellant tank jettisoned, not to be recovered. Orbiter accelerates into orbit to carry out its mission.*
- d. Reentry*
- e. Landing*

# Operations



Equipped with a delta wing, the orbiter will be approximately as large as a DC-9 jet aircraft. The cargo compartment will be 4.5 meters (15 feet) in diameter and 18 meters (60 feet) long. It will carry payloads up to 29,500 kilograms (65,000 pounds).

The orbiter is designed to carry a crew of up to seven, including scientific and technical personnel. Missions may last up to 30 days.

Each orbiter will be capable of performing a minimum of 100 missions. The solid propellant boosters will be flown approximately 10 times.

Since the maximum gravity forces experienced at launch and recovery will not exceed 3G's, any person in good health may travel to and from space in the Shuttle. Researchers will require only several weeks of familiarization training prior to missions.

Manned orbital test flights are scheduled to begin from the Kennedy Center in 1979. Operational status is expected in 1980. West Coast operations by the U.S. Air Force from Vandenberg Air Force Base are planned in the early 1980's.

Because of its versatility, the Shuttle is referred to as a general purpose launch system. The orbiter fuselage is designed to handle various payloads and support a variety of payload functions.

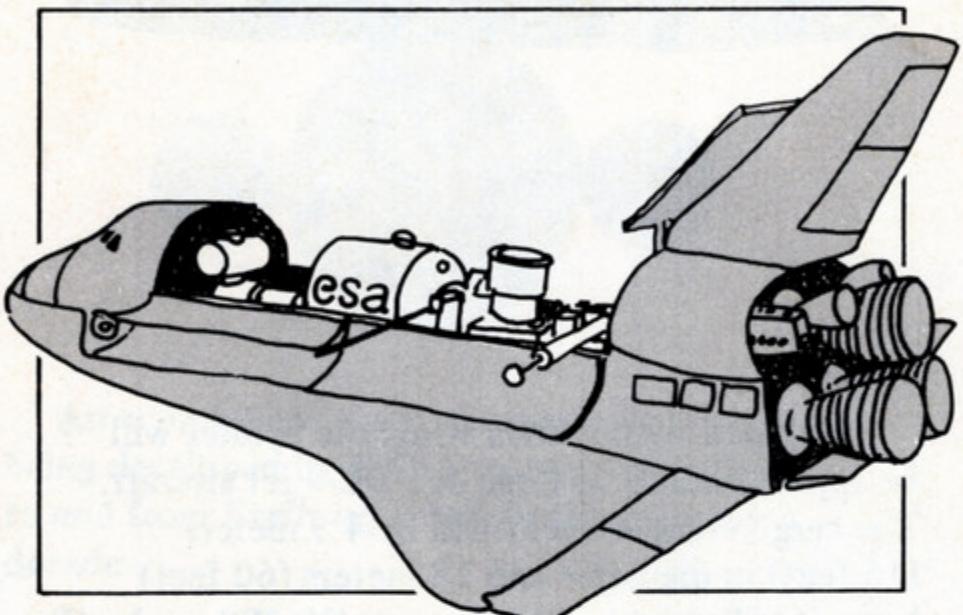
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After the Shuttle is fully operational, NASA will no longer require expendable rockets such as Delta, Centaur, Titan and Saturn. The Shuttle will enable crew members to supervise the release and placement of satellites in orbit, or to service and repair them, or return them to Earth if necessary. Automated satellites with propulsive stages attached will be deployed from the Shuttle and placed in high-energy trajectories.



## International Aspects

Lee R. Scherer, Director of the Kennedy Space Center, has stated: "The Shuttle will encourage more nations to participate in space activities since it will bring down the cost within reach of their resources. Joint experiments and enterprises will help make the benefits of space exploration and technology available to millions."

In this connection, in late 1973 the United States entered into an agreement with member nations in the European Space Agency by which ESA is designing and manufacturing reusable Spacelab flight units for the Shuttle. One configuration of Spacelab will consist of a pressurized manned laboratory module plus an instrumented platform to support telescopes, antennas and other equipment.

NASA has agreed to procure from ESA any additional Spacelab units which may later be required for the U.S. space program.

## Advantages

Four major reasons why the Shuttle is important to the nation's progress have been cited:

- it is needed to perform useful tasks in space
- it will make space operations much less costly and complex
- it can be developed and brought into operation by 1980 at a modest level of funding
- it will make possible wider participation in space flight and useful applications of space technology

The Space Shuttle era will begin approximately 20 years after the first U.S. venture into space, the launching of Explorer I on January 31, 1958. Since that date, unmanned spacecraft have probed the near and distant reaches of space. Men have explored the lunar surface and conducted hundreds of investigations during extended visits to the Skylab space station. The first international manned space mission, the Apollo Soyuz Test Project, was successfully completed in 1975.

This wealth of experience is now being applied to the development of the Space Shuttle as the vehicle which will permit routine operations in space.

